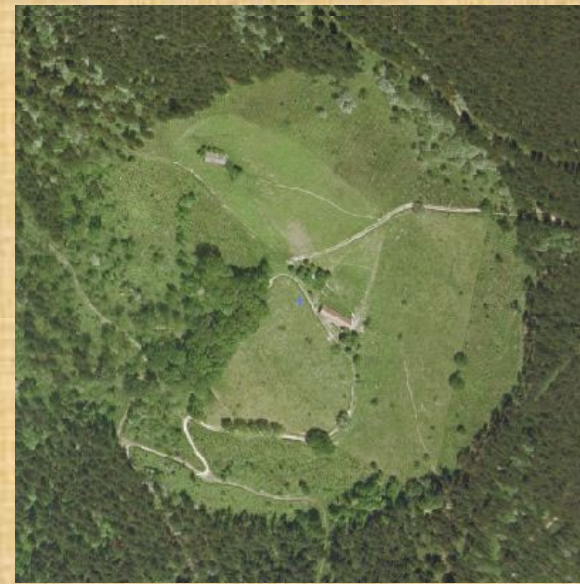




Indigenous Units of Measurement and Metrological Traditions along the Atlantic Façade: Configuring the Landscape with a Metrological *Sprachbund*

Presentation at the 24th annual conference of the European Society for Astronomy in Culture (SEAC). 'The Marriage of Astronomy and Culture: Theory and Method in the Study of Cultural Astronomy', 12th-16th September 2016, Bath, UK

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Evidence of the Septarian Package along the Atlantic Façade

- After more than thirty years of research into this question, it is now clear that units of measure, based on seven and its multiples, structured the laying out of traditional landholdings not only in the Basque Country, but also in France, Normandy, Ireland, Scotland and even England.
- The question we now face is whether these survivals can be traced back further back in the ethnocultural record of these zones.
- And that question is the one we will examine in this brief presentation.



Limits of the Basque-speaking zone, first century A.D.

The Septarian Package

- These septarian units of measure form part of what I call the Septarian Package.
- In this talk, we will see how this metrological *Sprachbund* and its geographical diffusion can be brought into play in order to examine cultural conceptualizations and practices that might be instantiated in megalithic structures found along the Atlantic Façade.
- As we will see, in the Basque Country the septarian units are central to the design of *saroiak*. These figures that mark the landscape are referred to as 'seles' in Spanish and in English as 'stone octagons' because of the way that they were laid out.
- They also form part of a remarkable coordinate system used in terrestrial and celestial navigation, a topic that was the focus of an earlier presentation in 2011 at the SEAC conference in Évora, Portugal.
- All along the Atlantic Façade there is evidence that similar septarian units were employed, suggesting a continuity of metrological practice and more particularly the association of the Septarian Package with agro-pastoral practices.

The Analogy of a Metrological *Sprachbund*

- That elements from the Septarian Package have survived in these zones raises a question: are they an indication that the Septarian Package might have a much deeper time depth and, as is the case of the Basque Country, that it might be a survival from even earlier efforts to cognitively configure the landscape?
- When highly distinctive units belonging to a well-structured metrological system are encountered in contiguous geographical locations, this often implies the existence of a type of metrological *Sprachbund*, a zone in which social collectives are dependent on a particular system of communication which permits the recording, storing and sharing of information in a consistent and meaningful fashion.
- In short, the employment of a unified system of measurement involves a tacit agreement on the part of the users in the same way that a common language involves a tacit agreement on the part of speakers and confers significant communicative advantages and benefits to the members of the social groups involved.

Review of Septarian Units of Measurement along the Atlantic Façade

Basque

- *Gizabete* standard, a staff of 7 'geometric feet'.

Iberian Peninsula & France

- *Estado, braza, brazada* unit for the Iberian Peninsula: 7 'geometric feet'.
- *Toise* standard for all of France: 6 'royal feet of Paris' = 7 'geometric feet'.

Survival of the 7 g. ft. unit (staff or rod) along the Atlantic Façade

- The size of the ‘feet’ making up the *toise* standard was redefined in the Early Middle Ages. As a result, they became slightly longer and were known as ‘royal feet of Paris’.
- The ‘feet’ employed officially on the Spanish side of the border were slightly shorter than the ‘royal feet of Paris’.
- Hence, on the French side of the border, the *toise* bar was defined as equal to ‘6 royal feet of Paris’ while on the Spanish side the bar standard of the same length was equal to ‘7 geometric feet,’ also referred to as ‘common feet’.
- The *toise* was the official pre-decimal metric standard of France and by the middle of the 18th century it was functioning as the “linear measure most commonly used by the royal armies and navies as well as in mathematical works in Spain, Italy, and a large part of the rest of Europe” (García Franco, 1957: 76).

Survival of the 7 g. ft. unit (staff or rod) along the Atlantic Façade

- Given its widespread usage, we may state that in practice the *toise* functioned as the pre-decimal metric standard for most of Europe.
- As a result, in the 18th century when astronomers from various nations undertook surveys to determine the length of 1° of meridional arc at different latitudes, their astronomical calculations were carried out using the *toise* bar, although not always one of precisely the same length.
- As such, the French bar standard, used in the elaboration of the decimal metric system, hearkens back to these earlier septarian-based units and metrological practices found along the Atlantic façade.
- In short, the *toise* unit should be considered a septarian survival that dates back to much earlier metrological practices and therefore is an integral part of the Septarian Package.

Geographical Diffusion of the 7 g. ft. Unit

- In fact, we could argue that the decimal metric model itself is based, albeit indirectly, upon a septarian unit of measurement that in turn was entrenched in a larger set of metrological traditions belonging to the Septarian Package.
- In order to bring this aspect of the data into clearer focus we need to keep in mind the geographical diffusion of the 7 g. ft. unit:
 - In Euskal Herria the unit is called a *gizabete* which translates as “full-man” or “whole-man”;
 - In the rest of the Iberian Peninsula a unit set at the same length was referred to as *estado*, *brazada*, *braza*, and *toesa*.
 - As noted, in France a unit of the same exact length was called a *toise* (Carrión Arregui, 1996; Martínez Gómez, [1795] 1816; Zupko, 1978: 175-176).

Survival of Other Septarian Units of Measurement Found along the Atlantic Façade

Basque

- The *hamalauoin* unit, a pole of 21 'geometric feet'.

Iberian Peninsula, France & British Isles

- The *pertiga* unit used for laying out land in the Iberian Peninsula was 21 'geometric feet' in length (or 3 *estados*).
- The *perche* unit used for laying out land in France was set originally at 21 'geometric feet' and later as 18 'royal feet of Paris', the latter feet being somewhat longer than the 'geometric feet'.
- In the British Isles traditionally a 21 ft. pole was also used to lay out land holdings.

Survival of Septarian Units of Weights along the Atlantic Façade

Basque

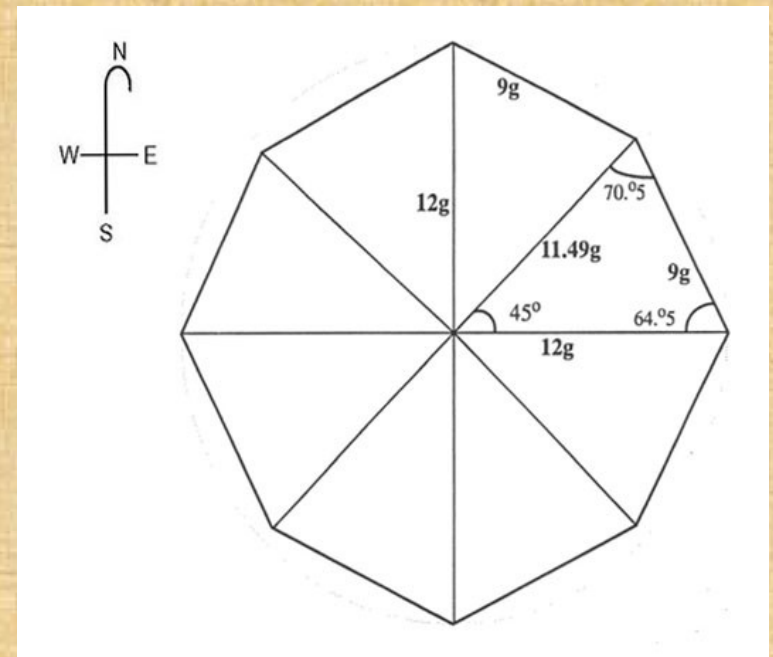
- The septarian system of weights has not survived in Euskal Herria (the Basque Country).

France & the British Isles

- A system of septarian units of 'stone' weights has survived, although the smaller 'stone' of 7 lbs., one called *clove* (*Fr. clou* < *Lat. clavus*), is no longer in use.
- Today only the 14 lb. stone is referred to when speaking of one's weight.
 - 1 stone = 14 lbs.
 - 2 stones = 28 lbs.
 - 4 stones = 56 lbs.
 - 8 stones = 112 lbs. (the old 'hundred weight')

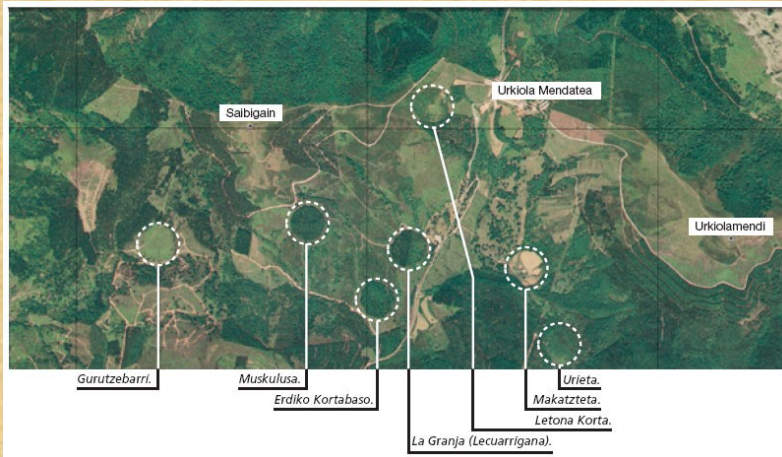
Design of the Standard Stone Octagon

- In Euskal Herria approximately 1000 circular enclosures called *saroiak* have been documented.
- Their dimensions were measured using a cord marked off with knots to show units of 49 ft. called *gorapila*.
- First, four outer stones were placed at a prescribed distance from the center stone to mark the four cardinal directions.
- The radius was set at 12 *gorapila*, units which gives a radius of 588 g. ft. or 164m.
- Next, four additional uprights were placed on the perimeter to mark the intercardinal positions so that the distance between each of them was 9 *gorapila*.
- The result was an irregular octagon and at the same time a configuration resembling a compass-rose.



Alignment of cardinal and intercardinal stones and the center stone.

Boundary Stones & Carbon-14 Dating



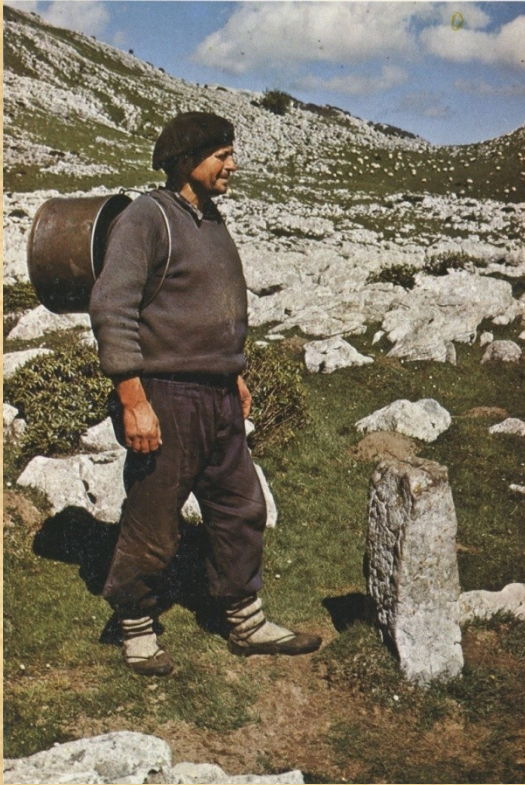
- It has been customary for each of these sites to have its own distinctive name.
- Only three of these sites have been Carbon-14 dated with the oldest result coinciding with the Late Bronze Age (9th century BCE.). However, further work needs to be done to firm up these Carbon-14 dates.
- The existing boundary stones are relatively inconspicuous and not easily recognized from a distance. Indeed, there is evidence that a large number of them are relatively modern and that in many instances the ones found today replaced the stones that earlier functioned as the center and boundary stones.



Center and Periphery Stones

- Nearly all of the old center stones as well as the uprights on the periphery were replaced several centuries ago with new stone markers, often of a standard size and shape.
- Overall, the replacement stones are significantly smaller than the old ones.
- In the photo to the right is the original center stone (*haustarria*) of the *saroi* of Pikuetaondarra which was carbon-dated to 2900 BP, i.e., to the Late Bronze Age.





The relatively modern center stones are often marked with radial lines to indicate the eight directions as well as the locations of the perimeter stones.



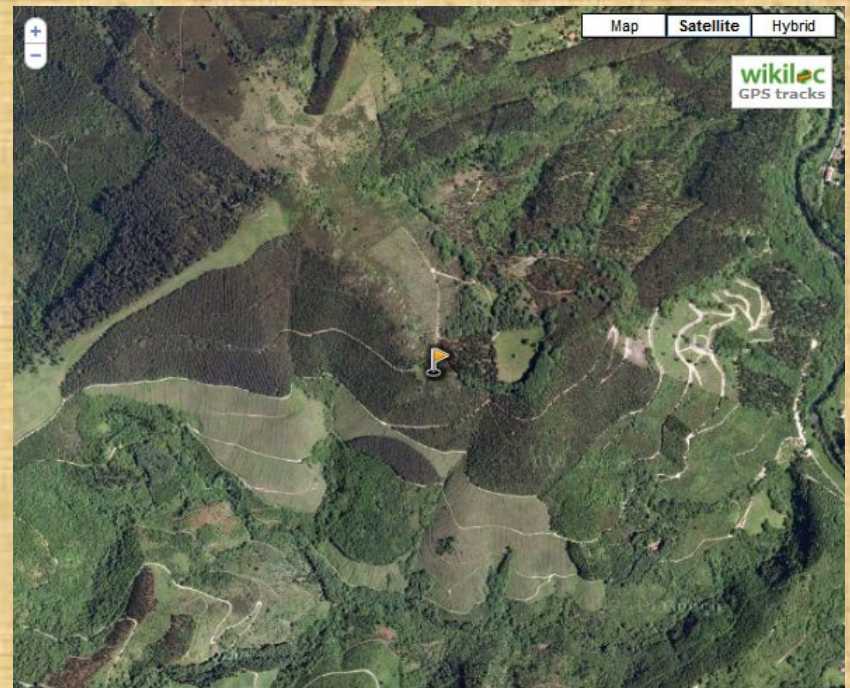


Example: Mulisko Gaina megalithic site (above)

Stone octagons are regularly found very near megalithic sites. In 2007 Zaldúa examined the distance between 70 megalithic sites and the stone octagons nearby. Bearing in mind the large size of the standard stone octagon itself—it has a diameter of 327m—the results of his study are noteworthy:

- 60% of all the megalithic sites are within 500m or closer
- Taken altogether, 81% of the megalithic sites are within 0-700m from a stone octagon.

Mulisko Gaina (yellow flag) & Mulisko *saroi* (lower left)



- 30% of the megalithic sites are 0-

Chronological Overlap

- Twenty cromlechs in this area have been excavated and dated to the Late Bronze Age (1,300–700 BCE) and Iron Age (800 BCE to 50 CE).
- These structures form part of a set of well documented pastoral sociocultural practices that also include the Basque *saroiak*.
- Although only a few of the sites have been excavated and dated, chronologically speaking there is an overlap and we can conclude that:
 - the same agro-pastoral social collectives who constructed the *saroiak* were also engaged in constructing and utilizing the cromlech stone circles situated in close proximity to these circular *saroiak* sites.



Researchers, therefore, have found clear linkages between those locations where pastoral activities were carried out, the megalithic sites and the *saroiak* nearby.



Aerial View of a Stone Octagon that is Now a Farmstead

Over time many of these sites evolved into farmsteads and became private property.

Many others remain as usufruct holdings on common lands.



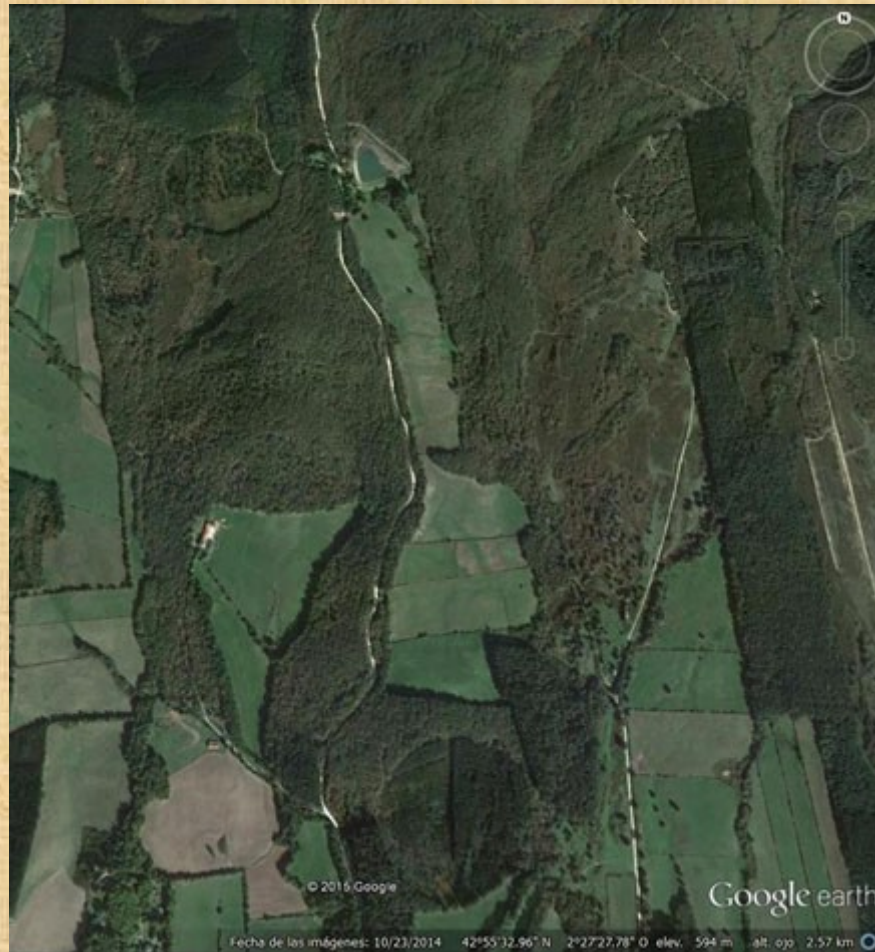
Another Aerial View of a Farmstead



Close-up Aerial View of Another Farmstead Situated inside a Stone Octagon



Aerial View of Forested Octagons



Another Example of a Standard Stone Octagon: Akola Sarobe



Akola is a typical stone octagon whose radius was set by law at 588 'geometric feet' or approximately 164m.

A Construction Feature: Fosse - *Lurbeki*

- A standard construction feature in the standard Basque stone octagon was its fosse, called a *lurbeki* (*lur-ebaki* 'earth-cutting').
- Today, for the most part, these trenches have filled in and are not particularly visible.
- In the Basque case, the *lurbeki* was probably a stylistic feature since sheep could easily navigate across it.



Close-up photo of the fosse surrounding Avebury

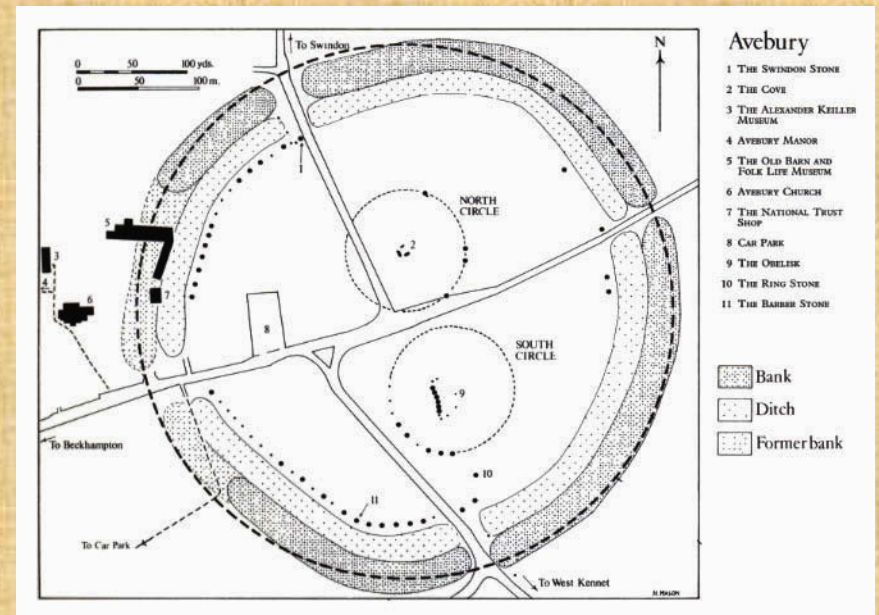
Memory, Metrological Traditions and Long-Term Landscape Inhabitation:

The Question of Avebury's Connection to the Septarian Package



Design and Dimensions of Avebury Circle

- Although an irregular circle, Avebury is said to have a radius of 165.8m.
- The radius the standard stone octagon is set at 12 *gorapila*, that is, 588 'geometric feet' or 164m.



Thom's diagram of Avebury

Conclusions: Structural and Conceptual Similarities

- Let us assume for a moment, purely hypothetically, that the social collectives who designed Avebury were employing units of measurement from the Septarian Package, These are units that have survived across the Atlantic Façade and are instantiated in the Basque stone octagons themselves. If so, Avebury ought to demonstrate structural and conceptual similarities to the *saroiak*.
- Keeping in mind the hypothetical nature of this scenario, the following similarities might be brought forward when comparing the two entities:
 - 1. Avebury is a site with a fosse around it
 - 2. Avebury is a figure whose dimensions nearly replicate those of the standard Basque stone octagon, dimensions prescribed in Basque law codes dating back to the 15th century.
 - 3. It is a construction laid out with uprights on its perimeter, although the stones at Avebury are monumental and more numerous than those found in the Basque stone octagons, at least today
 - 4. In both locations we have evidence that, historically, septarian units of measurement have been used to lay out land holdings

Structural and Conceptual Differences

- Yet there are significant differences between the two data sets.
 - Avebury forms part of a ritual complex indicating that it was the site of large-scale gatherings.
 - Whereas there is evidence that the smaller cromlech circles of stone frequently located quite near the Basque *saroiak* were gathering sites with socio-economic and political significance, no large-scale ritual complexes have been identified in Euskal Herria. Nonetheless, the design of the octagons suggests they originally had a ritual component, that they once embodied symbolic characteristics (orientation of the stones, marking cardinality and intercardinality; preoccupation with metrological precision).
 - Avebury is some two thousand years older than the oldest stone octagon identified so far, namely, that of Pikuetaondarra, whose C-14 dating is 2900 BP. Hence, we are talking about metrological traditions that show nearly three thousand years of cultural continuity.

A Final Question: Is There Another Septarian Signature in Avebury?

- Furthermore, if those who designed Avebury were indeed employing units of measurement from the Septarian Package, we might assume that Avebury would contain additional septarian signatures of some sort.
 - $4/7^{\text{th}}$ of 90 degrees is 51.428571.
 - Translated into degrees, minutes and seconds this equivalent to a latitudinal position of $51^{\circ} 25' 40''$ N.
 - It has been noted by others that the Avebury circle corresponds to $51^{\circ} 25' 40''$ N.
- But is this choice of location anything more than a totally bizarre and completely unintended consequence brought about by the architects of the site?

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